

## **NANOMETER SCALE DATA STORAGE DEVICE AND ASSOCIATED POSITIONING SYSTEM**

### **ABSTRACT OF THE DISCLOSURE**

A data storage system that includes a positioning system for positioning the write/read mechanism and the storage medium of the data storage device with respect to each other in first and second predefined directions. The positioning system comprises a positioning apparatus comprising microfabricated first and second positioning assemblies. The positioning system further comprises a controller to position a positionable support structure of the first positioning assembly in a first predefined direction within a range of positioning that is larger than the range of movement of a moveable support structure of the first positioning assembly by controlling (A) a stationary support structure clamp in clamping and unclamping the positionable structure to and from the support structure, (B) a moveable structure clamp in clamping and unclamping the positionable support structure to and from the moveable support structure, and (C) the movement of the moveable support structure. In one embodiment, one of the write/read mechanism and the storage medium is carried by the positionable support structure so that it is positioned with the first positioning assembly. The other one of the write/read mechanism and the storage medium is positioned with the second positioning assembly. In another embodiment, the positionable support structure carries the second positioning assembly and one of the write/read mechanism and the storage medium is positioned with the second positioning assembly while the other is held stationary. In several embodiments, the read/write mechanism is used to mechanically write data to and electrically read data from the storage medium. In still another embodiment, the read/write mechanism is used to optically write data to and electrically read data from the storage medium. In yet another embodiment, the read/write mechanism is acoustically aided in electrically writing data to and reading data from the storage medium.

PA 3318065 v1